

WHAT IS CLAIMED IS:

1. A method for storing hydrogen, said method comprising a step wherein organic compound is brought into contact with hydrogen gas in a pressurized state.
2. A method for storing hydrogen according to claim 1, wherein said organic compound is supported on a porous carrier.
3. A method for storing hydrogen according to claim 1 or 2, wherein said organic compound is capable of forming a hydrogen molecular compound by being brought into contact with hydrogen gas.
4. A method for storing hydrogen according to claim 3, wherein said molecular compound is hydrogen clathrate containing said organic compound as a host compound.
5. A method for storing hydrogen according to claim 4, wherein said organic compound is at least one selected from the group consisting of monomolecular type host compounds, multimolecular type host compounds, and high-molecular type host compounds.
6. A method for storing hydrogen according to claim 5, wherein said monomolecular type host compound is at least one selected from the group consisting of cyclodextrins, crown ethers, cryptands, cyclophanes, azacyclophanes, calixarenes, cyclotrimeratrylenes, spherands, and cyclic oligopeptides.
7. A method for storing hydrogen according to claim 6, wherein said multimolecular type host compound is at least one selected from the group consisting of ureas, thioureas, deoxycholates, perhydrotriphenylenes, tri-o-thymotides, bianthryls, spirobifluorenes, cyclophosphazenes, monoalcohols, diols, acetylene alcohols, hydroxybenzophenones, phenols, bisphenols, trisphenols, tetrakis phenols, polyphenols, naphthols,

bis-naphthols, diphenylmethanols, carboxylic amides, thioamides, bixanthene, carboxylic acids, imidazoles, hydroquinones, organic phosphorus compound, and organic silicon compound.

- 5 8. A method for storing hydrogen according to claim 7, wherein said multimolecular type host compound is at least one selected from the group consisting of urea,
- 1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol,
1,1-bis(2,4-dimethylphenyl)-2-propyn-1-ol,
- 10 1,1,4,4-tetraphenyl-2-butyne-1,4-diol,
1,1,6,6-tetrakis(2,4-dimethylphenyl)-2,4-hexadiyn-1,6-diol,
9,10-diphenyl-9,10-dihydroanthracene-9,10-diol,
9,10-bis(4-methylphenyl)-9,10-dihydroanthracene-9,10-diol,
1,1,2,2-tetraphenylethane-1,2-diol, 4-methoxyphenol,
- 15 2,4-dihydroxybenzophenone, 4,4'-dihydroxybenzophenone,
2,2'-dihydroxybenzophenone,
2,2',4,4'-tetrahydroxybenzophenone,
1,1-bis(4-hydroxyphenyl)cyclohexane, 4,4'-sulfonyl
bisphenol, 2,2'-methylene bis(4-methyl-6-t-butylphenol),
- 20 4,4'-ethylidene bisphenol,
4,4'-thiobis(3-methyl-6-t-butylphenol),
1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl)butane,
1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,
1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,
- 25 1,1,2,2-tetrakis(3-methyl-4-hydroxyphenyl)ethane,
1,1,2,2-tetrakis(3-fluoro-4-hydroxyphenyl)ethane,
 $\alpha,\alpha,\alpha',\alpha'$ -tetrakis(4-hydroxyphenyl)-p-xylene,
tetrakis(p-methoxyphenyl)ethylene,
3,6,3',6'-tetramethoxy-9,9'-bi-9H-xanthene, 3,6,3',6'-tetra
- 30 acetoxy-9,9'-bi-9H-xanthene,

3,6,3',6'-tetrahydroxy-9,9'-bi-9H-xanthene, gallic acid,
 methyl gallate, catechin, bis- β -naphthol,
 $\alpha,\alpha',\alpha',\alpha'$ -tetraphenyl-1,1'-biphenyl-2,2'-dimethanol,
 bis-dicyclohexylamide diphenirate, bis-dicyclohexylamide
 5 fumarate, cholic acid, deoxycholic acid,
 1,1,2,2-tetraphenylethane, tetrakis(p-iodophenyl)ethylene,
 9,9'-bianthryl, 1,1,2,2-tetrakis(4-carboxyphenyl)ethane,
 1,1,2,2-tetrakis(3-carboxyphenyl)ethane, acetylene
 dicarboxyl acid, 2,4,5-triphenyl imidazole,
 10 1,2,4,5-tetraphenyl imidazole, 2-phenyl
 phenanthro[9,10-d]imidazole,
 2-(o-cyanophenyl)phenanthro[9,10-d]imidazole,
 2-(m-cyanophenyl)phenanthro[9,10-d]imidazole,
 2-(p-cyanophenyl)phenanthro[9,10-d]imidazole, hydroquinone,
 15 2-t-buthyl hydroquinone, 2,5-di-t-buthyl hydroquinone,
 2,5-bis(2,4-dimethylphenyl)hydroquinone, and
 tri-m-trylphosphine.

9. A method for storing hydrogen according to claim 8, wherein
 said multi molecular type host compound is at least one selected
 20 from the group consisting of
 1,1-bis(4-hydroxyphenyl)cyclohexane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,
 tetrakis(p-methoxyphenyl)ethylene,
 25 tetrakis(p-iodophenyl)ethylene, 9,9'-bianthryl and
 1,1,2,2-tetraphenylethane,
 bis(dicyclohexylamide)diphenirate, bis-dicyclohexylamide
 fumarate,
 $\alpha,\alpha',\alpha',\alpha'$ -tetraphenyl-1,1'-biphenyl-2,2'-dimethanol,
 30 1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol, and

2-(m-cyanophenyl)phenanthro[9,10-d]imidazole.

10. A method for storing hydrogen according to claim 5, wherein said high-molecular type host compound is at least one selected from the group consisting of celluloses, starchs, chitins, chitosans, polyvinyl alcohols, polymers of polyethylene glycol arm type of which core is 1,1,2,2-tetrakis phenyl ethane, and polymers of polyethylene glycol arm type of which core is $\alpha, \alpha, \alpha', \alpha'$ -tetrakis phenyl xylene.

11. A method for storing hydrogen according to claim 4, wherein said organic compound is at least one selected from the group consisting of aromatic compounds, amide compounds, alcohol compounds, imidazole compounds, hydroquinones, ureas, carboxylic acids, cyclodextrines, polyphenols, cholic acids, celluloses, and organic phosphorous compounds.

12. A method for storing hydrogen according to claim 11, wherein said aromatic compounds are phenolic compounds.

13. A method for storing hydrogen according to any one of claims 1-12, wherein hydrogen gas is brought into contact with said organic compound at a pressure of higher than 1.0×10^{-10} MPa.

14. A method for storing hydrogen according to any one of claims 1-13, wherein hydrogen gas is brought into contact with said organic compound at a pressure between 1.0×10^{-10} MPa and 200 MPa.

15. Hydrogen clathrate enclosing hydrogen which is formed by contact reaction between a host compound and hydrogen.

16. Hydrogen clathrate according to claim 15, wherein said host compound is at least one selected from the group consisting of monomolecular type host compounds, multimolecular type host compounds, high-molecular type host compounds, and inorganic host compounds.

17. Hydrogen clathrate according to claim 16, wherein said monomolecular type host compound is at least one selected from the group consisting of cyclodextrins, crown ethers, cryptands, cyclophanes, azacyclophanes, calixarenes, cyclotriveratrylenes, spherands, and cyclic oligopeptides.
18. Hydrogen clathrate according to claim 16, wherein said multimolecular type host compound is at least one selected from the group consisting of ureas, thioureas, deoxycholates, perhydrotriphenylenes, tri-o-thymotides, bianthryls, spirobifluorenes, cyclophosphazenes, monoalcohols, diols, acetylene alcohols, hydroxybenzophenones, phenols, bisphenols, trisphenols, tetrakis phenol-base, polyphenols, naphthols, bis-naphthols, diphenylmethanols, carboxylic amides, thioamides, bixanthene, carboxylic acids, imidazoles, hydroquinones, organic phosphorus compound, and organic silicon compound.
19. Hydrogen clathrate according to claim 18, wherein said multimolecular type host compound is at least one selected from the group consisting of urea, 1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol, 1,1-bis(2,4-dimethylphenyl)-2-propyn-1-ol, 1,1,4,4-tetraphenyl-2-butyne-1,4-diol, 1,1,6,6-tetrakis(2,4-dimethylphenyl)-2,4-hexadiyn-1,6-diol, 9,10-diphenyl-9,10-dihydroanthracene-9,10-diol, 9,10-bis(4-methylphenyl)-9,10-dihydroanthracene-9,10-diol, 1,1,2,2-tetraphenylethane-1,2-diol, 4-methoxyphenol, 2,4-dihydroxybenzophenone, 4,4'-dihydroxybenzophenone, 2,2'-dihydroxybenzophenone, 2,2',4,4'-tetrahydroxybenzophenone, 1,1-bis(4-hydroxyphenyl)cyclohexane, 4,4'-sulfonyl

bisphenol, 2,2'-methylene bis(4-methyl-6-t-buthylphenol),
 4,4'-ethylidene bisphenol,
 4,4'-thiobis(3-methyl-6-t-butylphenol),
 1,1,3-tris(2-methyl-4-hydroxy-5-t-buthylphenyl)butane,
 5 1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,
 1,1,2,2-tetrakis(3-methyl-4-hydroxyphenyl)ethane,
 1,1,2,2-tetrakis(3-fluoro-4-hydroxyphenyl)ethane,
 α,α,α',α'-tetrakis(4-hydroxyphenyl)-p-xylene,
 10 tetrakis(p-methoxyphenyl)ethylene,
 3,6,3',6'-tetramethoxy-9,9'-bi-9H-xanthene, 3,6,3',6'-tetra
 acetoxy-9,9'-bi-9H-xanthene,
 3,6,3',6'-tetrahydroxy-9,9'-bi-9H-xanthene, gallic acid,
 methyl gallate, catechin, bis-β-naphthol,
 15 α,α,α',α'-tetraphenyl-1,1'-biphenyl-2,2'-dimethanol,
 bis-dicyclohexylamide diphenirate, bis-dicyclohexylamide
 fumarate, cholic acid, deoxycholic acid,
 1,1,2,2-tetraphenylethane, tetrakis(p-iodophenyl)ethylene,
 9,9'-bianthryl, 1,1,2,2-tetrakis(4-carboxyphenyl)ethane,
 20 1,1,2,2-tetrakis(3-carboxyphenyl)ethane, acetylene
 dicarboxyl acid, 2,4,5-triphenyl imidazole,
 1,2,4,5-tetraphenyl imidazole, 2-phenyl
 phenanthro[9,10-d]imidazole,
 2-(o-cyanophenyl)phenanthro[9,10-d]imidazole,
 25 2-(m-cyanophenyl)phenanthro[9,10-d]imidazole,
 2-(p-cyanophenyl)phenanthro[9,10-d]imidazole, hydroquinone,
 2-t-buthyl hydroquinone, 2,5-di-t-buthyl hydroquinone,
 2,5-bis(2,4-dimethylphenyl)hydroquinone, and
 tri-m-trylphosphine.
 30 20. Hydrogen clathrate according to claim 19, wherein said

multi molecular type host compound is at least one selected from the group consisting of

1,1-bis(4-hydroxyphenyl)cyclohexane,

1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,

5 1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,

tetrakis(p-methoxyphenyl)ethylene,

tetrakis(p-iodophenyl)ethylene, 9,9'-bianthryl,

1,1,2,2-tetraphenylethane,

bis(dicyclohexylamide)diphenirate, bis-dicyclohexylamide

10 fumarate,

$\alpha,\alpha,\alpha',\alpha'$ -tetraphenyl-1,1'-biphenyl-2,2'-dimethanol and

1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol, and

2-(m-cyanophenyl)phenanthro[9,10-d]imidazole.

21. Hydrogen clathrate according to claim 16, wherein said
15 high-molecular type host compound is at least one selected from the group consisting of celluloses, starchs, chitins, chitosans, polyvinyl alcohols, polymers of polyethylene glycol arm type of which core is 1,1,2,2-tetrakis phenyl ethane, and polymers of polyethylene glycol arm type of which core is
20 $\alpha,\alpha,\alpha',\alpha'$ -tetrakis phenyl xylene.

22. Hydrogen clathrate according to claim 16, whrein said inorganic host compound is at least one selected from the group consisting of clay minerals, monomorillonites, and zeolites.

23. Hydrogen clathrate according to claim 15, wherein said
25 host compound is at least one selected from the group consisting of aromatic compounds, amide compounds, alocohol compounds, imidazole compounds, hydroquinones, ureas, corboxilic acids, cyclodextrines, polyphenols, cholic acids, celluloses, and organic phosphorous compounds.

30 24. Hydrogen clathrate according to claim 23, whrein said

aromatic compounds are phenolic compounds.

25. A production method of a hydrogen clathrate comprising
a step of dissolving a host compound into a solvent, and
a step of recrystallizing the host compound with injecting
5 hydrogen into the solvent, and inserting hydrogen molecules
into crystal lattice of the host compound.

26. A production method of a hydrogen clathrate according to
claim 25, wherein said host compound is at least one selected
from the group consisting of monomolecular type host compounds,
10 multimolecular type host compounds, and high-molecular type
host compounds and inorganic host compounds.

27. A production method of a hydrogen clathrate according to
claim 26, wherein said monomolecular type host compounds is at
least one selected from the group consisting of cyclodextrins,
15 crown ethers, cryptands, cyclophanes, azacyclophanes,
calixarenes, cyclotrimeratriylenes, spherands, and cyclic
oligopeptides.

28. A production method of a hydrogen clathrate according to
claim 27, wherein said multimolecular type host compound is
20 at least one selected from the group consisting of ureas,
thioureas, deoxycholates, perhydrotriphenylenes,
tri-o-thymotides, bianthryls, spirobifluorenes,
cyclophosphazenes, monoalcohols, diols, acetylene alcohols,
hydroxybenzophenones, phenols, bisphenols, trisphenols,
25 tetrakis phenol-base, polyphenols, naphthols, bis-naphthols,
diphenylmethanols, carboxylic amides, thioamides, bixanthene,
carboxylic acids, imidazoles, hydroquinones, organic
phosphorus compound, and organic silicon compound.

29. A production method of a hydrogen clathrate according to
30 claim 28, wherein said multimolecular type host compound is

at least one selected from the group consisting of urea,
 1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol,
 1,1-bis(2,4-dimethylphenyl)-2-propyn-1-ol,
 1,1,4,4-tetraphenyl-2-butyne-1,4-diol,
 5 1,1,6,6-tetrakis(2,4-dimethylphenyl)-2,4-hexadiyn-1,6-diol,
 9,10-diphenyl-9,10-dihydroanthracene-9,10-diol,
 9,10-bis(4-methylphenyl)-9,10-dihydroanthracene-9,10-diol,
 1,1,2,2-tetraphenylethane-1,2-diol, 4-methoxyphenol,
 2,4-dihydroxybenzophenone, 4,4'-dihydroxybenzophenone,
 10 2,2'-dihydroxybenzophenone,
 2,2',4,4'-tetrahydroxybenzophenone,
 1,1-bis(4-hydroxyphenyl)cyclohexane, 4,4'-sulfonyl
 bisphenol, 2,2'-methylene bis(4-methyl-6-t-butylphenol),
 4,4'-ethylidene bisphenol,
 15 4,4'-thiobis(3-methyl-6-t-butylphenol),
 1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl)butane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,
 1,1,2,2-tetrakis(3-methyl-4-hydroxyphenyl)ethane,
 20 1,1,2,2-tetrakis(3-fluoro-4-hydroxyphenyl)ethane,
 $\alpha,\alpha,\alpha',\alpha'$ -tetrakis(4-hydroxyphenyl)-p-xylene,
 tetrakis(p-methoxyphenyl)ethylene,
 3,6,3',6'-tetramethoxy-9,9'-bi-9H-xanthene, 3,6,3',6'-tetra
 acetoxy-9,9'-bi-9H-xanthene,
 25 3,6,3',6'-tetrahydroxy-9,9'-bi-9H-xanthene, gallic acid,
 methyl gallate, catechin, bis- β -naphthol,
 $\alpha,\alpha,\alpha',\alpha'$ -tetraphenyl-1,1'-biphenyl-2,2'-dimethanol,
 bis-dicyclohexylamide diphenirate, bis-dicyclohexylamide
 fumarate, cholic acid, deoxycholic acid,
 30 1,1,2,2-tetraphenylethane, tetrakis(p-iodophenyl)ethylene,

9,9'-bianthryl, 1,1,2,2-tetrakis(4-carboxyphenyl)ethane,
1,1,2,2-tetrakis(3-carboxyphenyl)ethane, acetylene
dicarboxyl acid, 2,4,5-triphenyl imidazole,
1,2,4,5-tetraphenyl imidazole, 2-phenyl
5 phenanthro[9,10-d]imidazole,
2-(o-cyanophenyl)phenanthro[9,10-d]imidazole,
2-(m-cyanophenyl)phenanthro[9,10-d]imidazole,
2-(p-cyanophenyl)phenanthro[9,10-d]imidazole, hydroquinone,
2-t-buthyl hydroquinone, 2,5-di-t-buthyl hydroquinone,
10 2,5-bis(2,4-dimethylphenyl)hydroquinone, and
tri-m-trylphosphine.

30. A production method of a hydrogen clathrate according to
claim 29, wherein said multi molecular type host compound is
at least one selected from the group consisting of

15 1,1-bis(4-hydroxyphenyl)cyclohexane,
1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,
1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,
tetrakis(p-methoxyphenyl)ethylene,
tetrakis(p-iodophenyl)ethylene, 9,9'-bianthryl,
20 1,1,2,2-tetraphenylethane,
bis(dicyclohexylamide)diphenirate, bis-dicyclohexylamide
fumarate,
 $\alpha,\alpha,\alpha',\alpha'$ -tetraphenyl-1,1'-biphenyl-2,2'-dimethanol and
1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol, and
25 2-(m-cyanophenyl)phenanthro[9,10-d]imidazole.

31. A production method of a hydrogen clathrate according to
claim 26, wherein said high-molecular type host compound is
at least one selected from the group consisting of celluloses,
starches, chitins, chitosans, polyvinyl alcohols, polymers of
30 polyethylene glycol arm type of which core is 1,1,2,2-tetrakis

phenyl ethane, and polymers of polyethylene glycol arm type of which core is $\alpha, \alpha, \alpha', \alpha'$ -tetrakis phenyl xylene.

32. A production method of a hydrogen clathrate according to claim 26, wherein said inorganic host compound is at least one selected from the group consisting of clay minerals, montmorillonites, and zeolites.

33. A production method of a hydrogen clathrate as claimed in claim 25, wherein said host compound is a multimolecular type host compound such as phenolic type host compound, and wherein the solvent is at least one selected from the group consisting of alcohols such as methanol and ethanol, ketones such as acetone and methyl ethyl ketone, esters such as ethyl acetate, ethers such as diethyl ether and dibutyl ether, furans such as tetrahydrofuran, amides such as dimethyl acetamide, and aldehydes such as acetaldehyde and benzaldehyde.

34. A production method of a hydrogen clathrate comprising a step of bringing hydrogen gas into contact with a host compound in a pressurized state.

35. A production method of a hydrogen clathrate according to claim 34, wherein said host compound is at least one selected from the group consisting of monomolecular type host compounds, multimolecular type host compounds, and high-molecular type host compounds.

36. A production method of a hydrogen clathrate according to claim 35, wherein said monomolecular type compound is at least one selected from the group consisting of cyclodextrins, crown ethers, cryptands, cyclophanes, azacyclophanes, calixarenes, cyclotrimeratrylenes, spherands, and cyclic oligopeptides.

37. A production method of a hydrogen clathrate according to claim 35, wherein said multimolecular type host compound is

at least one selected from the group consisting of ureas, thioureas, deoxycholates, perhydrotriphenylenes, tri-o-thymotides, bianthrils, spirobifluorenes, cyclophosphazenes, monoalcohols, diols, acetylene alcohols, hydroxybenzophenones, phenols, bisphenols, trisphenols, tetrakis phenol-base, polyphenols, naphthols, bis-naphthols, diphenylmethanols, carboxylic amides, thioamides, bixanthene, carboxylic acids, imidazoles, hydroquinones, organic phosphorus compound, and organic silicon compound.

38. A production method of a hydrogen clathrate according to claim 37, wherein said multimolecular type host compound is at least one selected from the group consisting of urea, 1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol, 1,1-bis(2,4-dimethylphenyl)-2-propyn-1-ol, 1,1,4,4-tetraphenyl-2-butyne-1,4-diol, 1,1,6,6-tetrakis(2,4-dimethylphenyl)-2,4-hexadiyn-1,6-diol, 9,10-diphenyl-9,10-dihydroanthracene-9,10-diol, 9,10-bis(4-methylphenyl)-9,10-dihydroanthracene-9,10-diol, 1,1,2,2-tetraphenylethane-1,2-diol, 4-methoxyphenol, 2,4-dihydroxybenzophenone, 4,4'-dihydroxybenzophenone, 2,2'-dihydroxybenzophenone, 2,2',4,4'-tetrahydroxybenzophenone, 1,1-bis(4-hydroxyphenyl)cyclohexane, 4,4'-sulfonyl bisphenol, 2,2'-methylene bis(4-methyl-6-t-butylphenol), 4,4'-ethylidene bisphenol, 4,4'-thiobis(3-methyl-6-t-butylphenol), 1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl)butane, 1,1,2,2-tetrakis(4-hydroxyphenyl)ethane, 1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene, 1,1,2,2-tetrakis(3-methyl-4-hydroxyphenyl)ethane,

1,1,2,2-tetrakis(3-fluoro-4-hydroxyphenyl)ethane,
 α,α,α',α'-tetrakis(4-hydroxyphenyl)-p-xylene,
 tetrakis(p-methoxyphenyl)ethylene,
 3,6,3',6'-tetramethoxy-9,9'-bi-9H-xanthene, 3,6,3',6'-tetra
 5 acetoxo-9,9'-bi-9H-xanthene,
 3,6,3',6'-tetrahydroxy-9,9'-bi-9H-xanthene, gallic acid,
 methyl gallate, catechin, bis-β-naphthol,
 α,α,α',α'-tetraphenyl-1,1'-biphenyl-2,2'-dimethanol,
 bis-dicyclohexylamide diphenirate, bis-dicyclohexylamide
 10 fumarate, cholic acid, deoxycholic acid,
 1,1,2,2-tetraphenylethane, tetrakis(p-iodophenyl)ethylene,
 9,9'-bianthryl, 1,1,2,2-tetrakis(4-carboxyphenyl)ethane,
 1,1,2,2-tetrakis(3-carboxyphenyl)ethane, acetylene
 dicarboxyl acid, 2,4,5-triphenyl imidazole,
 15 1,2,4,5-tetraphenyl imidazole, 2-phenyl
 phenanthro[9,10-d]imidazole,
 2-(o-cyanophenyl)phenanthro[9,10-d]imidazole,
 2-(m-cyanophenyl)phenanthro[9,10-d]imidazole,
 2-(p-cyanophenyl)phenanthro[9,10-d]imidazole, hydroquinone,
 20 2-t-buthyl hydroquinone, 2,5-di-t-buthyl hydroquinone,
 2,5-bis(2,4-dimethylphenyl)hydroquinone, and
 tri-m-trylphosphine.

39. A production method of a hydrogen clathrate according to
 claim 38, wherein said multi molecular type host compound is
 25 at least one selected from the group consisting of
 1,1-bis(4-hydroxyphenyl)cyclohexane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethane,
 1,1,2,2-tetrakis(4-hydroxyphenyl)ethylene,
 tetrakis(p-methoxyphenyl)ethylene,
 30 tetrakis(p-iodophenyl)ethylene, 9,9'-bianthryl and

1,1,2,2-tetraphenylethane,
bis(dicyclohexylamide)diphenirate, bis-dicyclohexylamide
fumarate,

$\alpha,\alpha,\alpha',\alpha'$ -tetraphenyl-1,1'-biphenyl-2,2'-dimethanol,

5 1,1,6,6-tetraphenyl-2,4-hexadiyn-1,6-diol, and

2-(m-cyanophenyl)phenanthro[9,10-d]imidazole.

40. A production method of a hydrogen clathrate according to
claim 35, wherein said high-molecular type host compound is
at least one selected from the group consisting of celluloses,
10 starchs, chitins, chitosans, polyvinyl alcohols, polymers of
polyethylene glycol arm type of which core is 1,1,2,2-tetrakis
phenyl ethane, and polymers of polyethylene glycol arm type
of which core is $\alpha,\alpha,\alpha',\alpha'$ -tetrakis phenyl xylene.

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